NOTES ON ALGAE, — IV.

F. S. Collins.

Spirulina Meneghiniana Zanardini, Atti R. I. Inst. Veneto, Vol. VI, p. 80, 1847. This species, hitherto found only as isolated filaments among other algae, was found July 27, 1901, on the Marblehead shore, Massachusetts, near Clifton station, in considerable quantity. It formed the principal constituent of a mixture in rock tide pools, above high water mark, but reached by spray in stormy weather. At the bottom of these pools was a light green impalpable sediment, like a chemical precipitate, the least motion of the water stirring it up so that great care had to be taken to secure it for specimens. The greater part of this sediment was *S. Meneghiniana*, characterized by the filaments, less than 2 μ diam. coiled in a loose spiral, 3–5 μ diam. *S. subsalsa* Oersted, the common species of this coast, has trichomes and spiral of about the same diameter as in *S. Meneghiniana*, but in the latter species the spiral is open, in the former the turns are nearly or quite in contact. See figures in Gomont, Monogr. des Oscill., p. 250, Pl. VII.

Cylindrospermum stagnale (Kuetz.) Born. and Flah., Revision des Nost. Het., part 4, p. 250, 1888. This plant formed a dense bluish-green or brownish scum on the surface of an artificial pond at the Pogy oil factory, Bristol, Maine, near Round Pond Village, July 16, 1901. Its cylindrical spores distinguish it from all our other species except *C. minutissimum* Collins, while the smaller size of the latter, in all its parts, prevents any confusion of the two. Of the five established species of this genus recognized in Bornet and Flahault, Revision, in 1888, only two were credited to America; but now all five are known to occur in New England, as well as *C. minutissimum*, described in 1896.

At Pemaquid Point, Maine, July 18, 1901, the writer found growing on sloping rocks, exposed to the full force of the surf, which is very heavy here, what appeared to be a dense growth of *Calothrix scopulorum* (Web. and Mohr) Ag., common in such stations. On examination by the microscope, however, the filaments were seen to have abundant pseudo-branches, showing it to be of the genus *Dichothrix*. Fresh water species of *Dichothrix* are not uncommon in New England, and in temperate countries generally, but there are only two marine

species known, both epiphytic, occurring in tropical or subtropical regions, and both quite distinct from the plant now under consideration. The nearest described species would seem to be *D. compacta* (Ag.) Born. and Flah., a fresh water plant of Scandinavia of smaller dimensions and different habit. It seems safe, therefore, to consider it as a new species, characterized as follows.

DICHOTHRIX **rupicola** n. sp. Marine. Filaments forming a caespitose stratum, one mm. high, 15–22 μ diam., erect, penicillate, pseudobranched, ultimate branches flexuous-divaricate, acute. Sheath lamellate, yellow-brown, near the tip with dilated and lacerate ochreation. Trichomes aeruginous green to pale olive, 7–9 μ diam., terminating in a hair; length of articulations about equal to the diameter. Heterocysts basal. Forming a coating on sloping rocks, exposed to full force of the waves, Pemaquid Point, Maine, July 18, 1901.

CODIOLUM PUSILLUM forma **Americanum** Foslie. The *Vaucheria pusilla* of Lyngbye was placed in the genus Codiolum by Foslie, Tromsø Mus. Aarshefter, Vol. X, p. 190, and is distinguished from the other species of this genus by the long stipe, slender throughout and much narrowed at the base, and by the cylindrical or subcylindrical "clava," the latter being from one half to two thirds the length of the stipe. In forma *Americanum* the clava is generally longer, sometimes equalling the stipe, otherwise the form is the same as the type.

The specimens collected grew on a rock, near high water mark at Marblehead, Mass., covering it with a continuous coating, in the manner of *C. longipes* Foslie, but not showing so distinct a mottled aspect in drying as the latter. On June 1, 1901, and at a subsequent visit June 15, young plants and germinating spores were found in abundance among mature plants, and some of the latter were forming spores, but none quite perfect were seen. Possibly the emission of spores took place at a different time of day from the time of collecting.

At Pemaquid Point, on the same exposed rocky slope where *Dichothrix rupicola* was found, there occurred in pools at about half tide level, an abundant growth of what appeared at first to be a Cladophora, similar to *C. refracta* Areschoug, but of denser growth and with slenderer branches. On dissection and microscopic examination it became evident that the plant was not like any species of Cladophora known on this coast, the branching being confined to the extreme base of each tuft, the upper part consisting of simple, crisped filaments, much like those of *Rhizoclonium tortuosum* Kuetz. The next suppo-

sition was that it might be *R. pachydermum* Kjellm., found in northern Europe and reported from Greenland by Rosenvinge, but a specimen sent to Dr. Rosenvinge was pronounced by him to be distinct from the Greenland plant. The branching seems to be more extensive than in any genuine Rhizoclonium, while the fact that it is confined to a small basal portion of the tuft, much the greater part being quite unbranched, distinguishes it from any species of Cladophora known to the writer. On the whole it seems best to place it provisionally in the former genus.

RHIZOCLONIUM (?) **erectum** n. sp. Forming erect tufts arising from prostrate filaments, 70–100 μ diam., of irregularly shaped, very thick-walled cells, 1–2 diam. long, from which arise branches either with a few similar branches at the base or simple throughout, 20–50 μ diam., usually 30 μ, cells 3–6 diam. long, branches up to 30 cm. long, but so much and regularly crisped and curled that the tufts seldom exceed 10 cm. in height. In tide pools, half tide to low water mark, Pemaquid Point, Maine, July 18, 1901.

Ascophyllum nodosum forma *scorpioides* (Fl. Dan.) Reinke, Atlas Deutscher Meeresalgen, p. 33. Though probably merely a form produced by the environment, of one of our commonest rock weeds, in its extreme condition it would hardly be recognized as at all connected. Besides the size being reduced everyway, the flattened frond of the type becomes nearly or quite terete, the forkings are more abundant, while the lateral branches are few or lacking; vesicles and fructification are wanting. It was found at Cape Rosier, Maine, July, 1901, forming a matted coating on mud between tide marks, among the stems of Spartina, etc.

Polysiphonia Schuebelerii Foslie, Christiania Vidensk.-Selsk. Forhand., p. 3, 1881. At Round Pond harbor, in the town of Bristol, Maine, July 14, 1901, the writer found extensive growths of *Zostera marina* near the mouth of the harbor, from low water mark to several meters depth. Several kinds of algae were growing on this *Zostera*, and at one place the predominant species over a considerable area was a four-tubed *Polysiphonia*, which appeared to be a delicate *P. violacea* (Roth) Grev. A few specimens were taken, but when examined with the microscope, the specific determination was seen to be wrong, and it was suspected that it was *P. Schuebelerii*, originally described from specimens from Finmark, and more fully described and figured by Rosenvinge, Grønlands Havalger, p. 799, fig. 2; Pl. I, figs. 1–2. A reference to Dr. Rosenvinge confirmed this im-

pression, giving an interesting addition to our flora. *P. violacea*, which it resembles in habit and in the extent of the cortication, has branches arising in the axils of the hairs; in *P. Schuebelerii* a branch arises in place of a hair. *P. Olneyi* Harv., the only other of our species for which it is liable to be mistaken, has little or no cortication, and a more decided tendency to dichotomous branching.

Spermothamnion Turneri (Mert.) Aresch. is one of the commonest algae of southern New England, sometimes being washed ashore in such quantities as to give its dark red color to water and beach for miles, but its only record north of Cape Cod is a reference by Harvey, Nereis Bor.-Am., part 2, p. 241; "var. variabile, Boston, Dr. Durkee." At Cohasset, Mass., Oct. 12, 1901, the writer found it washed ashore rather plentifully, though by no means in such abundance as had been seen at Newport, R. I., at Nantucket, or in other places. Var. *variable* Harv. (*Callithamnion variabile* Ag.) has been distinguished from the type by having the branching of the erect fronds, which arise from a creeping filament, secund or alternate; in the type this branching is chiefly opposite, but occasionally alternate. In the Cohasset specimens, while the predominant form was alternate or secund, it was not uncommon to find one and the same creeping filament producing some fronds with opposite branching, some with alternate, some chiefly secund. It would seem that the varietal name was hardly worth maintaining.

Of the species above noted, three have been issued in Collins, Holden and Setchell, Phycotheca Boreali-Americana, Fasc. XVIII; *Cylindrospermum stagnale*, No. 856, *Spirulina Meneghiniana*, No. 852, *Codiolum pusillum* forma *Americanum*, No. 869. *Rhizoclonium erectum Dichothrix rupicola* and *Ascophyllum nodosum* forma *scorpioides* will be issued in a later fascicle.

The fact that the *Rhizoclonium* and the *Dichothrix* have been secured in quantity sufficient for distribution, and that the *Polysiphonia* has not, illustrates a principle which the algologist, perhaps more than any other kind of botanist, should always keep in mind; in case of doubt, take a large quantity. There is no danger of exterminating a species of algae, or of seriously reducing its number in any locality. If the plant has passed fruiting, it can do no harm to gather it; if not yet in fruit, new plants are certain to take the place of what is gathered; if in full fruit, a supply of spores, sufficient to furnish next year's growth a hundred times over, must have been already deposited. The writer

secured ample supplies of the *Rhizoclonium* and of the *Dichothrix* when first seen, without any idea that they were novelties; but a search for additional *Polysiphonia*, the day after the discovery, was unavailing; nearly everything else ever found on Zostera on the Maine coast was abundant, but not a trace of the desired species. The locality where yesterday hundreds of specimens could have been gathered without moving the boat, was no longer to be found.

MALDEN, MASSACHUSETTS.

THE "FALL DANDELIONS" OF NORTH AMERICA.

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The common fall dandelion of the eastern United States and Canada, the "arnica" of the Maine coast, *Leontodon autumnalis*, was apparently first recorded as an established plant in the United States in 1863 when, in the 4th edition of the Manual, Dr. Gray recorded it as "common in E. New England." The plant had been collected, however, by Cormack in Newfoundland in 1822 and there is also a specimen in the Gray Herbarium collected by Oakes (who died in 1848) in "shade" at Ipswich, Massachusetts. A specimen collected by Dr. Gray in 1848 is marked "spontaneous about Cambridge." From that time the plant has spread rapidly by roadsides and in fields throughout New England and eastern Canada, and it is now known westward to Ontario and Michigan, and south into Pennsylvania. A large form of the plant with very pubescent or even lanate involucres has been known to New England botanists for some years. This plant which cannot be separated specifically from the usually smoother *L. autumnalis* is the variety *pratensis* of Koch (*Apargia pratensis*, Link).

Leontodon autumnalis ordinarily has a more or less branching scape, the heads before anthesis are ascending, and the pappus consists of a single series of plumose bristles. Two other plants of another subgenus have been found occasionally on ballast about New York, Philadelphia, etc. These are *L. hirtus*, L. and *L. hispidus*, L. From *L. autumnalis* they are quickly distinguished by the simple naked scapes, the heads before anthesis nodding, and two rows of pappus. *L. hirtus* has recently been reported from an inland station in Penn-